# EXECUTIVE SECRETARIAT
## ROUTING SLIP

memo chrono

TO:

| | | ACTION | INFO | DATE | INITIAL |
|---|---|---|---|---|---|
| 1 | DCI | | X | | |
| 2 | DDCI | | X | | |
| 3 | EXDIR | | | | |
| 4 | D/ICS | | | | |
| 5 | DDI | | X | | |
| 6 | DDA | | | | |
| 7 | DDO | | | | |
| 8 | DDS&T | | | | |
| 9 | Chm/NIC | | | | |
| 10 | GC | | | | |
| 11 | IG | | | | |
| 12 | Compt | | | | |
| 13 | D/Pers | | | | |
| 14 | D/OLL | | | | |
| 15 | D/PAO | | | | |
| 16 | SA/IA | | | | |
| 17 | AO/DCI | | | | |
| 18 | C/IPD/OIS | | | | |
| 19 | NIO/ECON | | X | | |
| 20 | VC/NIC | X | | | |
| 21 | D/SOVA/DI | | X | | |
| 22 | | | | | |

SUSPENSE ______________ Date

Remarks

25X1

Executive Secretary

3 Apr 85
Date

3637 (10-81)

 25X1

Executive Registry
85- 1451

3 April 1985

MEMORANDUM FOR: National Intelligence Officer for Economics

FROM: Director of Central Intelligence

SUBJECT: Soviet Synthetic Fuel Projects

Admiral Bill Mott, who is chairman of a commission under the aegis of the Interior Department on strategic minerals, and Ed Noble, Chairman of the Synthetic Fuels Corporation, were over here a few weeks ago asking me what we know about the Kansk-Achinsk coal basin. SOVA provided the attached. Will you have somebody brief this to them in the manner which conforms to their clearances and the security classification of this material. Tell them this is in response to their request of some weeks ago.

William J. Casey

Attachment:
DDI 01549/85

25X1

DCI EXEC REG

25X1

SECRET

SECRET

The Director of Central Intelligence

Washington, D.C. 20505

Executive Registry
85- 1090

18 March 1985

MEMORANDUM FOR: Director of Soviet Analysis, DDI

FROM: DCI

What do we know about a synthetic fuel project in the Kanshachin (sp.?) Basin on the Ensei (sp.?) in western Siberia?

William J. Casey

25X1

SECRET 25X1

DDI- 01549/85

21 March 1985

MEMORANDUM FOR: Director of Central Intelligence
Deputy Director of Central Intelligence

VIA : Deputy Director for Intelligence

FROM : Douglas J. MacEachin
Director of Soviet Analysis

SUBJECT : Soviet Synthetic Fuel Projects

REFERENCE : DCI Inquiry, 18 March 1985

1. In the referenced memorandum you asked what we knew about a synthetic fuel project in the Kansk-Achinsk coal basin. For more than a decade, Moscow has linked development of synthetic fuels to expansion of its largest single coal source, the Kansk-Achinsk Basin located in East Siberia near the Yenisey river (see map). 25X1

as well as others of importance in determining how rapidly the Soviets can expand coal-based energy production. We have provided information relating to the synfuels development at Kansk-Achinsk as an attachment to this memorandum. 25X1 25X1

2. In our judgement Moscow cannot push synfuels development into a commercial-industrial phase until the 1990s. The USSR synfuels research program has focused on development of two technologies: a pyrolysis process and a direct coal-conversion process that yields synthetic liquid fuels. Pyrolysis involves heating the coal to produce a semicoke and small amounts of liquid fuel; direct conversion uses heat, pressure, and the addition of hydrogen to produce a maximum yield of liquid fuel. 25X1

3. The Soviets probably will not need substantial Western technical assistance to construct commercial coal pyrolysis facilities. On the other hand, the Soviet effort to improve the Bergius direct-conversion process--a technology pirated from Germany at the end of World War II--has met with only limited success. If the USSR decides to build a commercial direct-conversion facility during the 1990s, we believe that substantial

25X1

SECRET

SECRET [redacted] 25X1

Western assistance in technology and equipment would be required. Key events in Soviet synfuels development are highlighted below. [redacted] 25X1

4. Key Events in Soviet Synfuel Development

a. Background Events:

- In the mid-1970s, the West Germans and the Soviets agreed to exchanges of selected research results and technical information on synthetic fuels. These exchanges have been conducted annually. [redacted] 25X1
- Publication of the USSR's Long-Term Energy Program (March 1984) verified a goal to construct during 1990-2000 the first industrial-scale facilities for production of synfuels from Kansk-Achinsk coal. [redacted] 25X1
- During 1982, Soviet synfuel research was reorganized --past failures to advance domestic projects were publicized and Western synfuel programs were favorably reviewed. Western technologies for direct and indirect coal liquefaction were specifically noted by the Soviets. [redacted] 25X1

b. Recent Events:

- A plant using Kansk-Achinsk coal to demonstrate the commercial possibilities of the pyrolysis process was put into operation in 1983. [redacted] 25X1
- December 1984 marked the beginning of operations of a direct-conversion pilot plant that will test the feasibility of processing lignite into synthetic crude oil. [redacted] 25X1

[redacted] 25X1

[redacted] 25X1

Douglas J. MacEachin

Attachment:
as stated

SECRET [redacted] 25X1

25X1

ATTACHMENT

## Exploitation of Kansk-Achinsk Coal

Kansk-Achinsk has the largest proved reserves of any coal basin in the Soviet Union. According to Soviet coal industry journals, the basin contains about 600 billion tons of lignite, of which 140 billion tons are reportedly recoverable by surface mining methods. Since the average thickness of the coal seams in the basin ranges from 45 to 60 meters, the coal is readily extracted through low-cost, open-pit mining methods with a very low overburden-to-coal ratio. With such an enormous reserve base, Soviet energy planners have considered Kansk-Achinsk coal a major potential fuel source for electric power plants and feedstock for synthetic fuels manufacture. 25X1

Kansk-Achinsk coal is, however, a poor quality fuel. The high moisture content (about 40 percent), low heating value (3,300 kilocalories per kilogram), and variable physical and chemical characteristics make direct shipment by railroad from Kansk-Achinsk to power plants in the western USSR uneconomical. Kansk-Achinsk coal is also subject to spontaneous combustion in storage and transit and tends to freeze together in cold weather. 25X1

### Current Production and Long-Range Plans

The USSR decided to proceed with development of the Kansk-Achinsk basin in the late 1970s. Output has increased from 28 million tons in 1975 to an estimated 40 million tons in 1984.

25X1

 25X1
 [redacted]

[redacted] 25X1

The Soviet press reports that Moscow plans to produce about 70 million tons of coal at Kansk-Achinsk in 1990 and to increase output to 170-200 million tons per year (t/y) by 2000. To attain a production level of 170-200 million t/y, the Soviets plan to develop two new surface mines, Borodino 2 and Uryupskiy 1. Eventually the Soviets plan to develop three additional mines--Berezovskoye 2 and Italskiy 1 and 2--and increase total basin output to 350 million t/y. [redacted] 25X1

<u>What to Do With the Coal</u>?

Equipment capacity probably will not constrain development of the Kansk-Achinsk basin, but the Soviets will still have to overcome technical problems with the quality of the coal. The quality limits the maximum economically effective shipping radius to 1500 km--400 km short of major demand centers in the Urals and 2,000-3,000 km short of the industrial centers of the European USSR. Proposed solutions for rapid development of the Kansk-Achinsk basin have involved two general approaches:

-- Extracting the energy content of the coal in power plants near the mines in central Siberia and sending the electricity to the Western USSR over very high-capacity power transmission lines.

-- Upgrading the coal quality through processing in

 [redacted] 25X1

facilities near the mines and transporting the resulting semicoke, thermocoal, or liquid fuel to the western USSR. [redacted] 25X1

Semicoke and Thermocoal: A Dead End?

Earlier Soviet plans called for the large-scale production of either semicoke or thermocoal.[1] With these products, most of the moisture would be eliminated and as a result, the final products would be more economically transportable to the Western regions. In 1983 the USSR completed construction of a commercial demonstration facility at Krasnoyarsk--construction began in 1976. The facility uses pyrolysis to process to 1.2 million tons of Kansk-Achinsk coal per year and produce about 400,000 tons of semicoke, 54,000 tons of synthetic oil, and 120 million cubic meters of gas. Earlier media reports indicated plans to build three large-scale commercial pyrolysis facilities, each with the capacity to process 25-50 million tons of coal. [redacted] 25X1

We believe that the Soviets have scaled back their plans for using pyrolysis or thermocoal processes. [redacted] 25X1 [redacted] 25X1 research funds for the pyrolysis process were cut off in 1979. The USSR Long-Term Energy Program, which was circulated early in 1984, indicates plans to produce semicoke only on a limited basis

1 In the production of thermocoal, the moisture is simply removed by heating the coal to about 450 degrees centigrade; most of the volatile matter that contributes to better combustion remains. Although no synthetic liquids are produced, the heating value of Kansk-Achinsk coal is increased from about 3,500 kilocalories per kilogram to about 6,400 kilocalories per kilogram. In the production of semicoke by the pyrolysis process, coal is heated in the absence of air to about 550 degrees centigrade and some synthetic liquids are produced. [redacted] 25X1

from the Kansk-Achinsk coals that cause the worst boiler-fouling problems when burned--about 8-9 percent of the basin's reserves. The thermocoal process has also apparently lost support because no synthetic liquids are produced and transportation is required for a solid product. Soviet media reporting that has discussed prospects for the Kansk-Achinsk basin during the last few years seldom has mentioned pyrolysis or thermocoal and instead has emphasized plans for liquefaction. [redacted] 25X1

[redacted] 25X1

Coal Liquefaction

Despite serious research efforts during the past decade, Soviet technology for converting coal into liquid fuels (liquefaction) is only in the pilot-plant stage of development. The Soviet liquefaction process must still be perfected before being used in a commercial scale facility. The Soviets' dissatisfaction with their progress is evidenced by their attempts, during the past several years, to solicit cooperation in coal conversion technology from West German, Japanese, Italian, and US firms. [redacted] 25X1

The Soviet Union is currently operating a 5 t/d (input) direct conversion pilot plant--the ST-5 facility--(with an output of 1 ton per day of synthetic liquids) at a mine near Moscow. Construction of the plant began in 1981 but was not completed until 1984. The plant reportedly uses an improved version of the Bergius conversion process--a technology pirated from Germany at the end of World War II. If the process proves feasible, the Soviet media report plans to build a 75 t/d (input) liquefaction facility at the Berezovo mine in West Siberia. [redacted] 25X1

[redacted] 25X1

A recent media report indicates, however, that the Soviets are still evaluating coal liquefaction and that much work needs to be done before a full-scale commercial plant could be built. According to the USSR long-range energy goals, during 1986-90 the Soviets will attempt to develop and perfect coal liquefaction technology suitable for large-scale production of synthetic liquids. The Soviet liquefaction process has a low yield--about 20 percent--of synthetic liquids whereas the yield for most Western technologies is about 40-50 percent. During 1986-90, the Soviets may pursue joint-feasibility design studies of liquefaction processes with Western firms. [redacted] 25X1

Most of the proven direct conversion technology with pilot plant operating capacities greater than 5 t/d is of US origin. The US processes--EDS and H-coal--can work with a variety of coals, and the technology has been successfully tested with lignite-grade coals. Two West German firms, Ruhrkohle and Veba, operate the only significant direct-conversion facility located outside the US. Ruhrkohle, moreover, is a sponsor of the two US processes. Ruhrkohle may be able to share the technology with the USSR under the sponsoring agreement. We are trying to clarify this connection as we investigate the technology-transfer aspects of Soviet synfuel development. [redacted] 25X1

The USSR's Long-Term Energy Program calls for the construction of commercial direct-conversion facilities during the 1990s. We estimate that Western assistance in technology and equipment is essential in order to meet this goal. [redacted] 25X1 25X1 [redacted] 25X1 Moreover, the USSR is presently unable to build a reliable hydrocracker--a secondary oil refining technology that breaks down heavy fuel oils into lighter, more valuable products.[2] US experts indicate that most coal conversion technologies employ "everything available in a hydrocracker and then some." [redacted] 25X1 the USSR is unable to build reliable hydrocrackers because of equipment inadequacies, particularly the lack of high-pressure and high-temperature equipment. [redacted] 25X1

[redacted] 25X1